

IN THE MATTER OF  
KOREAN PATENT APPLICATION  
UNDER SERIAL NO. 42406/1999

I, THE UNDERSIGNED, HEREBY DECLARE :  
THAT I AM CONVERSANT WITH BOTH THE KOREAN AND THE ENGLISH  
LANGUAGES : AND

THAT I AM A COMPETENT TRANSLATOR OF THE APPLICATION PAPERS THE  
PARTICULARS OF WHICH ARE SET FORTH BELOW :

KOREAN PATENT APPLICATION UNDER  
SERIAL NO.: 42406/2000

FILED ON: OCTOBER 1, 1999

IN THE NAME OF: LG INFORMATION &  
COMMUNICATIONS LTD.

FOR: HAND-PHONE AND BATTERY FOR HAND-  
PHONE

IN WITNESS WHEREOF, I SET MY HAND HERETO

THIS 6TH DAY OF AUGUST, 2003

BY



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SHIN SOOK LEE

[Translation]

PATENT APPLICATION

To : Director General  
The Patent Office

Reference Number: 0007

Date of Application: October 1, 1999

Classification of International Patent: H04B

Title of the Invention: HAND-PHONE AND BATTERY FOR HAND-PHONE

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This application is hereby filed pursuant to Article 42 of the Patent Law.

/S/ Attorneys: Yong Bok KANG and Yong In KIM

[Translation]

[ABSTRACT OF THE DISCLOSURE]

[Abstract]

An antenna of a mobile phone is installed in a battery detachably attached to the mobile phone so that more inner space can be secured in the mobile phone. In addition, a performance of the mobile phone is enhanced by heightening a frequency gain of the mobile phone. The battery for the mobile phone includes: a battery cell having a certain shape; an antenna electrically connected to a phone body, having a certain shape, and positioned at one side of the battery cell; and a terminal pack for installing the battery cell and the antenna together therein.

[Representative drawing]

Figure 2

[Index words]

Mobile phone, battery

## [SPECIFICATION]

[Title of the Invention]

Mobile phone and battery for mobile phone

[Brief description of the Drawings]

Figure 1 is a sectional view of a general mobile phone;

Figure 2 is a perspective view showing a battery structure of a mobile phone in accordance with one embodiment of the present invention;

Figure 3 is a perspective view showing a battery structure of a mobile phone in accordance with another embodiment of the present invention; and

Figures 4A and 4B show antenna shapes in accordance with the present invention.

\*\*\*\* Explanation for the major reference numerals \*\*\*\*

10 : battery cell

20 : antenna

30 : battery pack

40 : dielectric material

[Detailed description of the invention]

[Object of the invention]

[Field of the invention and background art]

The present invention relates to a mobile phone, and a mobile phone suitable for embedding an antenna therein and a battery of the mobile phone.

As shown in Figure 1, an antenna for a general mobile phone includes a Helical antenna 1 fixed at an upper end of the terminal and an  $\lambda/4$  monopole antenna 2 installed in the mobile phone and drawn out for use. The reason of using the two types of antennas

for the mobile phone is to minimize the length of the antenna but obtain a high frequency gain.

The operation of the Helical antenna 1 and the  $\lambda/4$  monopole antenna 2 will now be described. When a current is generated for the antenna by a power feed, an electronic wave is radiated by the current. At this time, if only the Helical antenna 1 is used without drawing out the  $\lambda/4$  monopole antenna 2, a resonance frequency is tuned to a receiving side. Meanwhile, if the Helical antenna 1 is used with the  $\lambda/4$  monopole antenna 2 drawn out, the corresponding resonance frequency is tuned for the transmitting side. A gain of the antenna is higher with the  $\lambda/4$  monopole antenna 2 drawn out for use than without it.

However, as shown in Figure 1, the conventional mobile phone requires an inner space for installing the monopole antenna, running counter to the tendency of a light, thin and compact type mobile phone.

In addition, because the Helical antenna remains protruded outwardly, when a user takes it out of a pocket or bag for an urgent use, the mobile antenna would be caught by the pocket or the bag. Meanwhile, in case of reducing the length of the Helical antenna, the frequency gain is reduced to degrade an overall performance of the mobile phone.

Thus, in such a communication environment, it would be quite desirable to obtain more internal space of the mobile phone and heighten its frequency gain while the antenna of the mobile phone remains installed in the mobile phone.

[Technical gist of the present invention]

Therefore, an object of the present invention is to provide a mobile phone with an antenna installed in a detachably attached battery, thereby obtaining more inner space of the mobile phone and heightening a frequency gain, and a battery for the mobile phone.

To achieve the above object, there is provided a battery for a mobile phone

including: a battery cell having a certain shape; an antenna electrically connected to a phone body, having a certain shape, and positioned at one side of the battery cell; and a terminal pack for installing the battery cell and the antenna together therein.

To achieve the above object, there is also provided a mobile phone including: a phone body; and a battery detachably attached at the entire portion or at a portion of one side of the phone body, said battery consisting of a battery cell having a certain shape; an antenna electrically connected to the phone body, having a certain shape, and positioned at one side of the battery cell; and a terminal pack for installing the battery cell and the antenna together therein.

[Construction and operation of the present invention]

The construction and operation of the mobile phone in accordance with one embodiment of the present invention will now be described.

Figure 2 is a perspective view of a battery structure of a mobile phone in accordance with one embodiment of the present invention, showing an antenna is positioned at an upper side of a battery cell.

With reference to Figure 2, a battery includes a battery cell 10 with a certain shape, an antenna 20 with a certain shape positioned at an upper surface of the battery cell 10, and a terminal pack 20 having the battery cell 10 and the antenna 20 therein.

Meanwhile, as shown in Figure 3, an antenna 60 can be positioned at the side of the battery cell 10. In this case, the side of the battery cell 10 where the antenna 60 is positioned is the opposite side of the side where the battery pack 30 is coupled to the body of the mobile phone, that is, an outer side of the phone. The reason is because if the side of the battery cell 10 where the antenna 60 is positioned is the same as the side where the battery pack 30 is coupled to the body of the mobile phone, the antenna 60

would be positioned between the battery pack 30 and the body of the mobile phone, resulting in deterioration of frequency characteristics.

As shown in Figures 2 and 3, a space is preferably provided between the antenna 20 and the battery cell 10 so that a dielectric material 50 or the air can serve as a dielectric substance therebetween.

The antennas 20 and 60 of Figures 1 and 2 includes terminals to be connected to a ground terminal and a radio frequency processor of the mobile phone.

Figures 4A and 4B show antenna shapes in accordance with the present invention.

With reference to Figures 4A and 4B, it is shown that the antenna impleted with a linear or a zigzag wire, and may have a circular shape or an oval shape as necessary. In addition, a thickness of the wire of the antenna can be adjusted as required and the antenna can be single wire or a plurality of wires.

Referring to the size of the battery detachably attached at a rear side of the mobile phone, there are a small battery applied to a portion of the mobile phone and a large battery with the almost same size as the mobile phone. In this respect, because better frequency characteristics are obtained with a large surface area of the antenna, the large battery is preferably used.

#### [Effect of the invention]

As so far described, the mobile phone of the present invention has the following advantages.

That is, the antenna of the mobile phone is inserted in the battery which is detachably attached to the mobile phone. Thus, the space required for installing the monopole antenna in the conventional mobile phone is secured, so that the mobile phone can be compact as much as the space.

In addition, the frequency characteristics of the mobile phone can be heightened to remarkably enhance the performance of the mobile phone.



What is claimed is:

1. A battery for a mobile phone comprising:  
a battery cell having a certain shape;  
an antenna electrically connected to a phone body, having a certain shape, and positioned at one side of the battery cell; and  
a terminal pack for installing the battery cell and the antenna together therein.
2. The battery of claim 1, wherein a dielectric substance with a certain thickness or a certain space is provided between the antenna and the battery cell.
3. The battery of claim 1, wherein one side of the battery cell is the opposite side of a side where the battery is coupled to the body.
4. A mobile phone comprising:  
a phone body; and  
a battery detachably attached at the entire portion or at a portion of one side of the phone body,  
wherein said battery comprises:  
a battery cell having a certain shape;  
an antenna electrically connected to the phone body, having a certain shape, and positioned at one side of the battery cell; and  
a terminal pack for installing the battery cell and the antenna together therein.

FIG. 1  
BACKGROUND ART

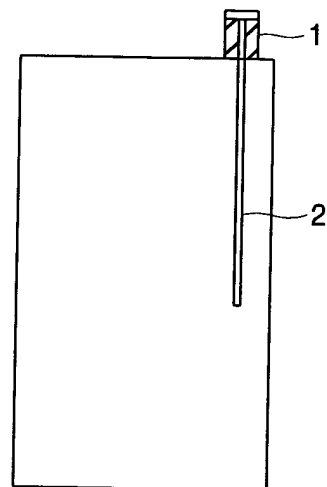


FIG. 2

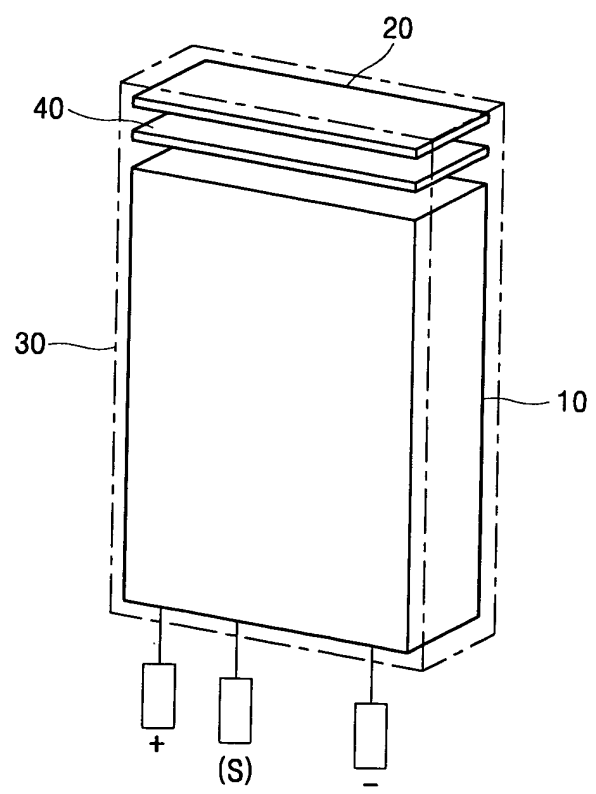




FIG. 3

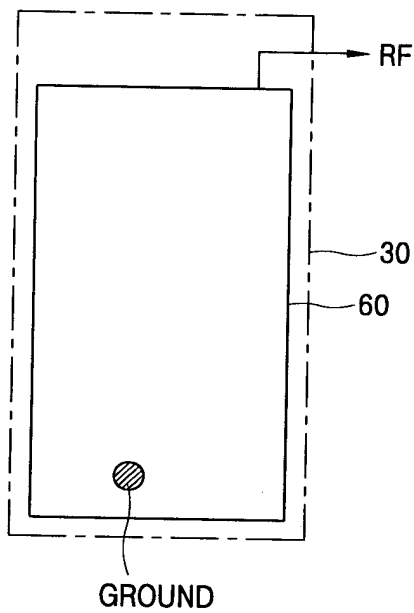


FIG. 4a

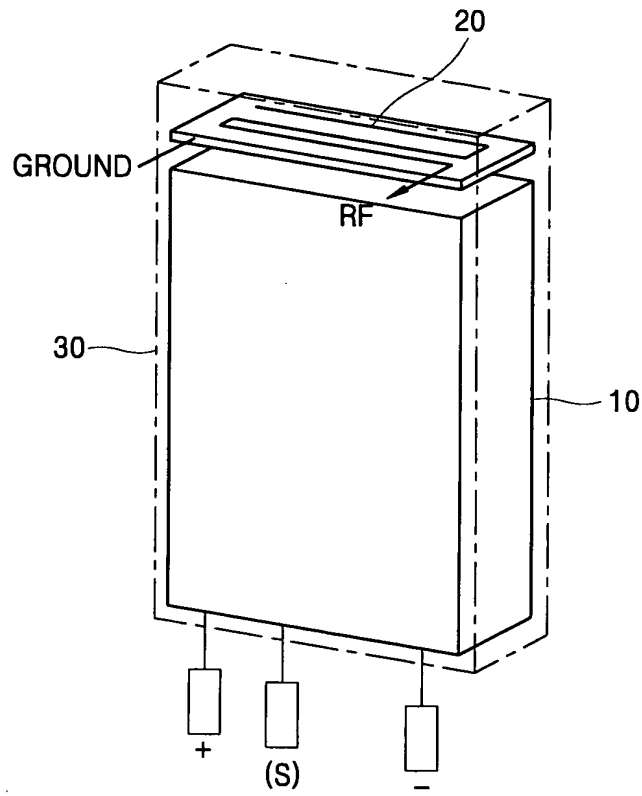


FIG. 4b

